

TRANSFORMATION OF THE ARMY DEPOT MAINTENANCE SYSTEM

BY

COLONEL RONALD J. PULIGNANI
United States Army

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USAWC STRATEGY RESEARCH PROJECT

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Colonel Ronald J. Pulignani
United States Army

Professor Bernard F. Griffard
Project Adviser

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U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

ABSTRACT

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The recent 2005 Base Realignment and Closure (BRAC) reduced depot infrastructure DOD wide but did little to modernize and transform its depots into a joint system. The Services' current depot systems are legacy establishments whose foundations were laid in the early twentieth century. With the evolution of the commercial defense industrial base during World War II and the Cold War, their research and development roles migrated to the private sector. For example, the Army system consists of 5 depots that maintain, overhaul, and repair military systems. In general they are Cold War facilities with all the inherent inefficiencies implied in that description. To remain relevant the Army, its sister services and DOD must work on transforming these service depots through lean philosophies, public private partnerships, performance based logistics, and capital investment programs to bring the depot system into the 21st Century to support the overall DOD transformation. Transformation of the depot system requires more efficiency, effectiveness and flexibility to reduce duplication of effort, overhead and long term costs.

TRANSFORMATION OF THE ARMY DEPOT MAINTENANCE SYSTEM

The recent 2005 Base Realignment and Closure (BRAC) reduced depot maintenance infrastructure Department of Defense (DOD) wide but did little to modernize and transform its depots into a joint system. The Services' current depot systems are legacy establishments whose foundations were laid in the early twentieth century. With the evolution of the commercial defense industrial base during World War II and the Cold War, their research and development roles largely migrated to the private sector. For example, the Army system consists of five maintenance depots that maintain, overhaul, and repair military systems. In addition the Army also has four manufacturing facilities that can perform the same missions as the maintenance depots. In general, these installations are Cold War facilities with all the inherent inefficiencies implied in that description. To remain relevant, the Army, its sister services and DOD must work on transforming these service depots. The Army and DOD must leverage lean philosophies, public private partnerships, performance based logistics, and capital investment programs to bring the depot system into the 21st Century to support the overall DOD transformation. Transformation of the depot system requires more efficiency, effectiveness and flexibility to reduce duplication of effort, overhead and long term costs.

Much has been written over the years on how to best maximize the Department of Defense depots and manufacturing facilities, which are legacy establishments of the Cold War. However, much of this has fallen on deaf ears. Depot maintenance is big business. The Army depots and manufacturing facilities are generally located in areas where they are the main source of income for the local community. Closure of one of these facilities or reduction of workload would meet with resistance and draw a response from elected officials. One of the largest and most active caucuses in Congress is the Depot Caucus. The members of this caucus have a vested interest in workload assigned to these facilities.

The time to leverage public-private partnerships, better business practices, and laws to move these installations into the 21st Century is now. Laws will have to be rewritten to better define the missions of these installations. To gain greater effectiveness and efficiency, the Army's depots and arsenals must be integrated into a joint system, which looks out not just six years, a POM cycle, but looks out to 2025. This is imperative for the Army as its maintenance depots will play a critical role in resetting over 50 brigades, consisting of 615 aircraft, 7,000 combat vehicles, and 30,000 wheeled vehicles.¹

The focus of this paper is not to argue the results of BRAC but to offer how to best maximize the five maintenance depots, three arsenals, and one manufacturing center in support

of the Army and the Department of Defense. It should be noted that the Army is the only service that has arsenals. For the purpose of this paper arsenals will be referred to as manufacturing facilities. The depots and manufacturing facilities and major missions are shown in Table 1.

Anniston Army Depot	Center of Industrial and Technical Excellence (CITE) for combat tracked vehicles
Corpus Christi Army Depot	Rotary wing aircraft
Letterkenny Army Depot	CITE for Air Defense and Tactical Missiles
Red River Army Depot	CITE for tactical wheeled vehicle, small emplacement excavator, Bradley Fighting Vehicles, and Multiple Launched Rocket System
Tobyhanna Army Depot	CITE for Communications and Electronics, Avionics, and Missile Guidance and Control
Lima Army Tank Plant	End to end production facility for heavy and light combat vehicles
Pine Bluff Arsenal	Sole producer for NBC filters, sole facility for rebuild of NBC masks, sole source for chemical test equipment, and sole supplier for producing white phosphorous. ²
Rock Island Arsenal	DOD's only vertically integrated manufacturing facility
Watervliet Arsenal	Life cycle armaments research and development, manufacturing for large bore cannon tubes

Table 1. Depots and Manufacturing Facilities

The Army depot system is part of the DOD depot system which consists of 22 Depots among the 4 services. Not included in these depots are the Army's four manufacturing facilities. In FY03, across these 22 depots, roughly 69,000 personnel accomplished 83 million hours of work of which 17% of the work was inter-serviced. The services spent approximately \$9 billion in the private sector to accomplish depot maintenance work.³

History

Before examining how we can better optimize the Army's depots and arsenals the following question must be answered - Why does the Army retain an industrial base? On April 2, 1794, Congress appropriated funds for the building of arsenals as well as the manufacture of armaments and ammunition with the expressed purpose of making the United States

independent from foreign nations for essential military war materiel. The first facility was the Arsenal at Springfield, Massachusetts, which was in operation until 1968.⁴ The Army Organic Industrial Base as it exists today came about during World War II when the Army was purchasing new, modernized and sophisticated equipment.⁵ This base consists of Army ammunition plants, maintenance depots and arsenals.⁶ A capability was needed to support this equipment, which led to the creation of government owned and government operated depots. Additionally, the development of government owned and contractor operated facilities focused on capturing the strengths of both the commercial sector and the organic bases. After World War II, the base was expanded to meet the expanding requirements of the U.S. military. The end of the Cold War left excess capacity within the depot maintenance base supporting a steadily shrinking military. The Army has relied on the Base Realignment and Closure process to downsize this base. Five BRAC rounds (1988, 1991, 1993, 1995, and 2005) leave us the base we have today. Since the first BRAC round in 1988, the Department of Defense has closed 15 depots across the services.⁷ BRAC has reduced the Army base from eight maintenance depots to five.⁸

Laws

Before discussing how to transform the maintenance depots and manufacturing facilities it is important to be aware of several key laws that impact these facilities. These laws principally impact workload and public-private partnerships. Some of the key laws are as shown in table 2.

The Arsenal Act 1920.	This statute is six lines long and applies only to the Army. This act requires the Secretary of the Army to have the “supplies needed by the Department of the Army” made in arsenals as long as it is on an economical basis. (10 U.S.C. 4532)
Core Logistics 1984.	This statute requires DOD to maintain “core capabilities that are necessary to maintain and repair weapon systems and other military equipment”. Core is developed by the services in consultation the Chairman of Joint Chiefs of Staff based on strategic and contingency plans. This law requires that DOD maintain a government owned and operated base and workload in peacetime to preserve necessary surge and reconstitution capabilities. (10 U.S.C. 2464)

Limitation on the Performance of Depot Level Maintenance of Materiel 1988 (Fifty-Fifty Rule).	Under this law no more than 50 percent of funds appropriated for depot level maintenance can be used to contract for work outside to a non federal entity. (10 U.S.C. 2466)
Centers of Industrial and Technical Excellence (CITE) 1997.	Under this law depot maintenance activities designated as CITES can enter in partnerships with private industry for the designated core competency. Additionally, it provides greater flexibility as it allows private industry to lease or use underutilized capacity and equipment at the depot for either military or commercial purposes. (10 U.S.C. 2474)
Enhance Use Leases (EULs) 2000.	This law enables private industry to negotiate long term leases of government property. (10 U.S.C. 2667)
Arsenal Support Program Initiative (ASPI) 2001.	This law enables arsenals to enter into agreements with private industry in which private industry may use arsenal facilities in exchange for investing or upgrading arsenal properties.

Table 2. Key Laws

BRAC

As previously mentioned, BRAC has been used to reduce excess capacity. The Secretary of Defense's November 15, 2002 kick off memo for the 2005 BRAC stated he wanted to transform through BRAC - unlike other BRACs where the focus was on the reduction of excess property.⁹ The Secretary of the Army directed in a 24 March 2003 memo to the Commanding General Army Materiel Command to "use BRAC to conduct its Industrial Base Transformation".¹⁰

Many resources have continually cited the Base Realignment and Closure as the only way for the Department of Defense to effectively close depots. During the 2005 BRAC, the Army recommended the closure of Red River Army Depot. In the Secretary of the Army's testimony to the BRAC Commission he stated the following in regards to the closure of Red River Army Depot:

In the last 50 years, the highest number of direct labor hours that have to be generated in these eight –these eight sites is 25 million direct labor hours. By closing Red River and then configuring it into centers of excellence....we have the ability to – still surge to 50 million direct labor hours. So we can double the capacity with one less depot.¹¹

The BRAC Commission did not support the closure of Red River Army Depot recommending the Depot be realigned retaining most of its depot maintenance functions.¹² Arguably, the Department of Defense still has excess capacity among its 22 depots. The Secretary of the Army in his testimony to the BRAC Commission was basically saying if the Army applied industry standards of 2 ½ shifts per day vice the 1- 8-5 standard that is used to determine workload in the Army's depots it could easily close a depot.

The intent of the BRAC 2005 analysis on depot maintenance was to focus on joint solutions through the consolidation of common depot functions to gain efficiencies and effectiveness. The end state was to identify the best location and size the capability to support it with a focus out to 2025.

The Army's overall intent was to use BRAC as a change agent to transform the Army Organic Industrial base as well as to integrate it into a joint solution where possible. The Army's analysis focused on realigning or closing installations to integrate critical capabilities to enhance Jointness, efficiency, and reduce cost. This would enable the Army to transform the Army Organic Industrial Base eliminating single function installations and creating multifunctional and multiuse facilities, which enable it to partner with industry to maximize the capabilities from both sources to achieve the "most favorable and economical efficiencies for DOD".¹³ The Army's military value evaluated both its depots and arsenals on its production capability and its joint workload flexibility. In short, the Army was looking at the capacity being used in each facility and how much of the workload was inter-service workload and how well it partnered with industry.¹⁴ The Army chose to evaluate its depots and arsenals together as maintenance and manufacturing centers. These types of facilities can do both missions. Traditionally, maintenance depots perform a variety of missions – maintenance, supply, and storage. They also overhaul, rebuild, modify, convert, and repair and fabricate Army equipment.¹⁵ Manufacturing centers receive store and incorporate raw materials and sub components into the manufacturing process for end items of equipment and components.

Why an Army Organic Industrial Base

The Army strategy is to rely on the commercial sector to the maximum extent possible in support of defense production.¹⁶ If the private sector lacks a required capability, the organic base acts as gap filler. It is also tasked to maintain a surge capability to maintain a surge capability and a guarantor of competition. As General Paul J. Kern, a former Commander of the United States Army Materiel Command stated in his article on Transforming the Industrial Base, the Army's Industrial Base is seen as the "nation's insurance policy".¹⁷

There are numerous examples of how the Army Organic Industrial Base served as our “nation’s insurance policy”. During the Global War on Terrorism these depots stepped in to respond to surge requirements that could not be met by the private sector. Some examples include:

- The Army’s depots and manufacturing facilities ability to take steel purchased from private companies make it into steel plates, assemble into kits and ship forward into theater to apply to HMMWVs by depot teams in theater.¹⁸
- Anniston Army Depot’s small arms repair capability which met the need to repair M2 machine guns; a capability that no longer existed in the private sector.¹⁹
- The establishment of a depot at Camp Arifjan, Kuwait. Personnel from stateside depots were able to move forward into theater, build a depot from scratch, man it and provide the much needed maintenance repair for forces fighting in Iraq. Depot commanders deploy from the United States on a rotational basis to command the Depot. This impressive example demonstrates the flexibility of the Army Organic Industrial Base’s ability to quickly respond to emerging requirements with personnel and equipment; something that the private sector cannot do.

It is essential to discuss how the depots are sized. Each depot maintains a core capability. Core is determined by assessing required capabilities for maintenance and repair of weapon systems and military equipment as identified by contingency scenarios prepared by the Joint Chiefs of Staff. This allows the depots to respond to the challenges of mobilization, national crisis and other emergencies. Core drives the size of the depot, equipment required, and the skill sets required of the workforce. The core depot maintenance capabilities for a weapon system are assigned to a specific Center for Industrial and technical Excellence (CITE). This allows the depots to establish public-private partnerships. These partnerships help to bring private industry expertise related to the core competency of the depot. The Army manufacturing facilities do not have a core workload. Current core requirements only look at the near future and not long term. For new weapon systems, the specific facility has 4 years from initial operating capability of the weapon system to establish the core capability for the weapon system. As such, it does not allow the depots to properly train a work force or to provide capital improvement for future systems.

There are several transformational options that the Army can use to make its depot and manufacturing facilities more effective and efficient. These include Lean Six Sigma, public-private partnerships, performance based logistics, capital investment program, workforce

transformation, and integration of the Army depot and manufacturing facilities into a DOD system.

Lean Six Sigma

Lean Six Sigma (LSS) is a management technique that cuts costs while shortening production lead times. Over time industry has saved significant dollars and increased productivity. An example of private industry's successes is Motorola, which has saved of \$11 billion and tripled its productivity.²⁰

As previously discussed, the Army maintenance depots were stood up as state of the art facilities to support the modernization of the Army during World War II. Since the end of the Cold War, the Army's depots have not been able to keep up with private industry and have been deemed as inefficient.²¹

The United States Army Materiel Command (USAMC) adopted Lean philosophies around 2002 to improve the efficiency of its depots. It has aggressively incorporated lean strategies across the Army Organic Industrial Base with great success. It has trained over 150 people at each of its five depots as well as incorporating lean thinking in all of its business strategies.²² The theme of USAMC "...is to be faster, more agile, less bureaucratic....was adopted for one reason, to provide better support to the Warfighter."²³ What this has done for the Army depot system is that it has allowed it to compete with private industry. "This culture is 'transforming the DoD industrial base into a competitive strike force.'"²⁴ A few examples of the depots success are as follows:

- Letterkenny Army Depot has reduced cost by \$11.9 million and freed up 50,000 square feet of floor space.²⁵
- Red River Army Depot increased output 260% on the Heavy Expanded Mobility Tactical Trucks (HEMMTs) and decreased cycle time by 75%.²⁶
- Corpus Christi Army Depot increased mean time between overhauls 383% on the T700 engines and reduced overhaul cycle time 69%.²⁷
- Tobyhanna Army Depot reduced repair cycle time 42% on the AN/TPS-75 Radar.²⁸
- Anniston Army Depot increased productivity on the AVDS engine by 30% and reduced turnaround time by 50%.²⁹

These successes among others have resulted in improved efficiencies and customer satisfaction, a reduction in resources – people and facilities, reduced repair time, joint savings, and have help to bring the private sector into the depots. The Army must build upon these

successes through continuous process improvement (CPI). CPI is an approach that creates the development of a culture of continuous improvement.

LSS is a component of continuous process improvement. Other measures under CPI that Army can leverage are balanced score card, ISO certifications, rewarding employees, voluntary protection program, and public-private partnerships.

Public-Private Partnerships, EULs, ASPIs, and FGCs

Public-private partnerships enable the maintenance depots and manufacturing facilities to maintain their critical skill base, increase capacity utilization, help to meet surge requirements, and allows private industry to share in investment costs for facilities and equipment. Industry's flexible hiring practices permit it to rapidly support surge requirements.

A great example of this was demonstrated in support of Tobyhanna Army Depot during the Global War on Terrorism. To meet surge requirements Tobyhanna partnered with Lockheed Martin to bring 500 civilian contractors aboard to work in its depot while it had members of its government work force deployed forward in theater.³⁰

Corpus Christi has partnered with General Electric for engineering and logistic support. Most significantly, through this partnership, it has been able to reduce its time spent on overhauling a T700 engine to one third of what it previously took.³¹

Anniston Army Depot has been a leader not only in the Army but across DOD since forming its first partnership with General Dynamics in 1996 to refurbish and upgrade the M1 tank. Since this time, Anniston Army Depot has initiated a total of 41 public private partnerships, which have generated 4.4 million man hours, \$548 million, and 216K square foot of depot facility utilization.³² Anniston also has 33% of all Army partnerships, 88% of total private sector development and roughly 26% of its workload is done by its partners.³³ Most recently, Anniston served as a sub-contractor for General Dynamics on the Stryker program where this partnership was able to deliver production vehicles within six months.³⁴ This demonstrates how government infrastructure can support private industry.

Sierra Army Depot currently stores over 2,000 combat vehicles.³⁵ The Army could benefit by establishing Sierra Army Depot as a long term storage facility for its vehicles much like the Air Force does for aircraft at its Aerospace Maintenance and Regeneration Center (AMARC) located at Davis-Monthan Air Force Base, Arizona. The AMARC provides the Air Force the capability for storage of aircraft, aircraft regeneration, limited depot level maintenance, and parts reclamation. The AMARC currently has 4,200 aircraft and 40 aerospace vehicles, with an original purchase price of \$33 billion, from all services, the Coast Guard, and numerous Federal

Agencies.³⁶ The environmental conditions at Davis-Monthan, low rainfall and humidity and alkaline soil, make it ideal to store aircraft indefinitely.³⁷

The mission of Sierra Army Depot is to “serve as the Expeditionary Logistics Center and Joint strategic power projection support platform providing support in the form of storage, maintenance, assembly, critical Operational Project Systems including Deployable Medical and containerization as a Center of Industrial Technical Excellence (CITE) for Systems, Petroleum and Water Systems, Force Provider, Strategic configured loads, and other items as directed.”³⁸ The Army currently stores its vehicles at the Defense Logistics Agency (DLA) activities located on its Depots at Anniston, Letterkenny, and Red River at a significant cost. Consolidation of all Army combat vehicles at Sierra will enable the Army to reclaim parts for sustainment of its legacy systems. These parts can be delivered to the Depot recapitalization programs to reduce procurement costs. Additionally, identification of vehicles that are not economically repairable can be scheduled for demilitarization and the monies gained for scrap can be reinvested into the long term storage costs.

Much like AMARC, Sierra Army Depot could serve as a Department of Defense facility for long term vehicle storage for all services combat and tactical wheeled vehicles. Additionally, Sierra Army Depot could serve as a long term storage facility for the other services operational project stocks. It could leverage its designation as a CITE to reduce cost to the Warfighter.

During the BRAC 2005 analysis, the Army identified Watervliet Arsenal, Rock Island Arsenal, Pine Bluff Arsenal, and Lima Army Tank Plant as installations with unique capabilities, which the Army needed to retain. Watervliet Arsenal and Rock Island Arsenal had utilization rates of 34 and 36 percent respectively.³⁹ Watervliet had eight unique processes used to produce large bore cannons⁴⁰ and Rock Island was the only domestic producer for towed howitzers.⁴¹ Lima Army Tank Plant was retained because the Army’s acquisition strategy for Future Combat Systems included manufacturing vehicles chassis at Lima Army Tank Plant.⁴² Its utilization rate was 32%.⁴³ The Army retained Pine Bluff Arsenal for its unique capabilities for chemical defense equipment and as the sole supplier for white phosphorous. It should be noted that all four of these facilities retain capabilities that allowed them to manufacture parts for the Army’s legacy systems that are not found in the private sector.

During the BRAC analytical process the Arsenal and Business & Technology Partnership at Watervliet Arsenal proposed to the Army that the core capabilities that the Army needed to retain at Watervliet be consolidated and surrounded by high technology and academic partners. Once this was done, the entire site would be conveyed to a non-government entity, and the Army would lease back the facilities it required.⁴⁴ Proposals such as this one would enable the

Army to partner with industry in the research and development in the armament arena and relieve the Army of the overhead of operating Watervliet. Conversely, the Army could leverage both the ASPI and EUL laws to do the same thing. The Army needs to leverage the ASPI and EULs laws to bring private industry into these facilities to increase capacity utilization.

Also, during BRAC, the closure of Riverbank Army Ammunition Plant resulted in its metal parts capabilities being moved to Rock Island Arsenal. This is unique as this was a government owned, contractor operated facility. This realignment allowed for the Army to better maximize the capacity at Rock Island Arsenal.

A recent example of a successful EUL is at Picatinny Arsenal. Picatinny working with private industry negotiated a 50 year lease to develop 120 acres on the installation, which will be called the Picatinny Applied Research Complex. This will be a nonmilitary complex that will attract companies working with technologies that will have both military and commercial uses. Most importantly, this could earn Picatinny over \$500 million over the next 50 years.⁴⁵

Multiple Rand studies have suggested that the Army transition Rock Island Arsenal and Watervliet Arsenal into Federal Government Corporations (FGCs). Lima Army Tank Plant and Pine Bluff Arsenal would also be prime candidates for FGCs.

FGCs are as old as the nation itself, and chartered by an act of Congress. The first FGC was the Bank of America charter in 1791. Today, there are 70 FGCs in the United States.⁴⁶ Some notable FGCs are Fannie Mae, Freddie Mac, Federal Home Loan Banks, the United States Post Office to name a few.⁴⁷ The benefit of using FGCs is that it brings together the best of the private and public sector. In the case of Rock Island Arsenal, Watervliet Arsenal, Lima Army Tank Plant and Pine Bluff Arsenal, if these installations were converted to FGCs, this would allow the United States Government to retain the manufacturing capability it needs to support National Defense requirements, and it will allow the Army to divest of unneeded infrastructure. Additional benefits are it allows the government a great deal of autonomy and flexibility of ownership, federal governance, and how these facilities are operated.⁴⁸

In summary, public-private partnerships enable the Army to maintain readiness at its industrial facilities. If applied properly the Army can leverage the private sector to provide the funding to maintain underutilized capacity, which may be critical for a national crisis or war and at the same time allows the private sector to use the unique capabilities inherent to the depots and manufacturing facilities. Additionally, partnering enables the government to maintain a rapid response capability as demonstrated by Tobyhanna Army Depot to meet operational requirements, eliminating the burden of having contingency contracts in place.

Performance Based Logistics

Performance Based Logistics (PBL) is now DOD's preferred product support vehicle. Designed to streamline the supply chain, PBL allows DOD to buy outcomes from private industry for the readiness of its weapon systems vice products and services. In short it mandates measurable performance metrics. PBL provides incentives for private industry to improve upon the performance of weapon systems, and sees the public sector and the private sector working hand and hand to come up with the best solution. It can lead to private industry investing into the depots for capital equipment to support specific core capabilities.

Capital Investment Program

The Capital Investment Program (CIP) is a 16 year plan for the modernization and replacement of depot facilities and infrastructure. It is covered in 10 U.S.C. 2208. For this to be successful, the CIP needs to consider the Army's transformation to the Future Combat System, core requirements, CITEs, and the support our depots and manufacturing facilities provide to the Joint Warfighter. The must be done in conjunction with the Program Executive Officers for all weapon systems. Currently, the Army in its FY 2005-2009 Future Years Defense Program has \$104 million for capital investment; far short of the \$3.66 billion estimated for capital investment for the Army depots.⁴⁹

Work Force Transformation

Between 1987 and 2002, employment at the DOD industrial facilities has declined over 50% from roughly 160,000 people to about 75,000.⁵⁰ During this time the median age of the depot maintenance workforce increased from 40 years to 47 years.⁵¹ The situation is direr for the Army. The average age of civilian personnel working in Army industrial facilities is 49 with 52% eligible to retire by 2009.⁵² These reductions have created a "hump" in the number of retiree eligible personnel. To overcome this large exodus of personnel and maintain a quality workforce with the unique skills that are inherent to the Army's maintenance and manufacturing facilities, the Army must implement replenishment and recruitment strategies to ensure for a strong and viable workforce.

Several replenishment strategies that the Army has identified include academic partnerships, re-payment of student loans, improved marketing and an enhance applicant pool.⁵³

Anniston Army Depot has been the forerunner of initiating many programs to revitalize its work force. Most significant is its Cooperative Education Programs to deal with the projected retirements where either local technical colleges or recruitment can backfill the projected

shortages. In FY00 Anniston Army Depot instituted a High school Co-op Program. This program was developed in partnership with the Alabama State Department of Education. This program has increased the skilled labor force available to the Depot.⁵⁴ Programs such as the one at Anniston are funded through the Depot's Army Working Capital fund and the state.⁵⁵

Additionally, the Army must ensure that it ties its replenishment strategy to its depots core requirements. This has to be not just for the systems that are currently in the inventory but for future systems. This implies that the workforce must be multi-skilled.

Integration into a DOD System

Establishment of a Joint Depot Maintenance Command (JDMC) has been discussed for a number of years. A 1993 Depot Maintenance Consolidation Study promulgated the benefits that a Joint Depot Maintenance Command would provide, such as relative costs savings, capacity reduction, and elimination of duplication among others.⁵⁶ Under a JDMC, the services would retain control of their facilities, and DOD would have visibility over all 22 depots to ensure for greater effectiveness and efficiency. The JDMC will workload the depots that are designated as CITES vice depots doing work that is not assigned as a CITE. A JDMC would enable DOD to workload the depots to ensure for maximum capacity usage. The JDMC would also ensure that all service depots were maximizing partnerships and PBL arrangements. An example is the Marine Corps depots at Barstow and Albany. These two depots would be tied into Anniston's or Red River's partnerships with industry. The same argument applies to the capital investment plan. CIP is statutory hence if the USMC has a plan to upgrade the same capability as the Army is this feasible especially since costs are recouped from the working capital fund. A JDMC could prevent the redundancy and pass the savings back to the Warfighter.

One must address who would command the JDMC. It would potentially be a three star that would rotate among the services. Interestingly, one could argue that this command could fall under a Joint Logistics Command. This concept has been discussed for many years. A potential structure for this command would include not only the JDMC, but the Army's Joint Munitions Command at Rock Island Arsenal, Illinois; the Defense Logistics Agency at Fort Belvoir, Virginia; and TRANSCOM at Scott Air Force Base, Illinois. A Joint Logistics Command would gain greater effectiveness and efficiency for the Warfighter as it would have oversight of all the major logistics commands.

Integration into a Joint system would potentially result in laws having to be amended or eliminated. The Arsenal Act is outdated and vague – is it prudent to incorporate the four manufacturing facilities into the laws for the depots such as core and CITEs. The four

manufacturing facilities have no core work load, in such a law could give them a more direct mission. The Arsenal Act as written allows for politics to play a part. When looking at Watervliet Arsenal and Rock Island Arsenal and their capacity utilization of 34% and 36% respectively, this means jobs in different parts of the country. Another question is because these four manufacturing facilities are unique should they fall under the Department of Defense and not the Army ?

The Army should rename their facilities to better reflect what they do. If the installation is a CITE then it should be noted as such. Possible naming conventions are The Department of Defense Center for Industrial and Technical Excellence for Combat Vehicles at Anniston. The remaining four Army depots would be named after the CITES designations. Possible naming conventions for the four manufacturing facilities could be The Department of Defense Joint Manufacturing and Technology Center at Rock Island (Pine Bluff and Watervliet). Lima Army Tank Plant is now officially called the Joint Manufacturing Systems Center.

Potentially, an argument can be made to rotate command of the Army depots among the services. Approximately 50% of the workload performed by Tobyhanna Army Depot is Air Force work. It would be logical than to rotate the command between the Army and the Air Force. For the ground depots, the commands would rotate between the Army and the Marine Corps. Corpus Christi Army Depot could rotate among all four services.

Recommendations

In order for continuous improvement to work the Army must have a long term strategy to deal with the following recommendations:

- For CPI to become a driving force, the Army must continue to institutionalize metrics, certify personnel, provide documentation guidance, and have forums to discuss initiatives.
- The Army must build on its success with lean six sigma.
- Arguably, to make the depots and manufacturing facilities more efficient and effective some laws may have to be amended, or the Army and DOD may need to be more aggressive in taking advantage of the laws. Key examples are CITE, EUL, and ASPI. These laws will bring private industry investment into the depots and manufacturing facilities. The Arsenal Act should be eliminated and the manufacturing facilities should be designated as CITEs and assigned a core workload.

- The Army must support the capital investment into its depots and manufacturing facilities to ensure that they remain relevant and do not continue to lag behind private industry.
- The Army must continue to apply performance based logistics in support of all weapon systems.
- The Army needs to provide funding for the replenishment of its depot and manufacturing facilities workforce. The workforce is the lifeblood of these facilities and has shown its ability to react to the emerging requirements of the Global War on Terrorism. The Army should use the success of Anniston Army Depot's work force revitalization plan as a model for all other facilities to follow.
- Establish Sierra Army Depot as the DOD Center for Industrial and Technical Excellence for Long Term Combat and Tactical Vehicle Storage and Operational Project Stocks.
- The Army should explore the possibility of converting Watervliet Arsenal, Rock Island Arsenal, Pine Bluff Arsenal, and Lima Army Tank Plant to Federal Government Corporations. If the Army decides not to do this, these facilities should fall under DOD due to their unique capabilities.
- DOD should establish a Joint Depot Maintenance Command to synchronize the 22 depots among the services to gain greater effectiveness and efficiencies in support of the Warfighter.

Summary

For the Army's maintenance depots and manufacturing facilities to continue to be relevant in the 21st Century, the Army in conjunction with DOD must transform to meet the needs of the 21st Century Warfighter. This transformation has to include cost efficiencies that will enable the Army to reinvest these savings back into its maintenance and manufacturing facilities.

Through continuous process improvement the Army can ensure it is continually moving forward by identifying better ways to do business. The Army can leverage lean six sigma and public-private partnerships. These vehicles will ensure that the Army's depots and manufacturing facilities can remain competitive with the private sector and at the same time bring out the best of both the government base and private industry to improve government facilities.

A perfect candidate for a public-private partnership is the storage of combat vehicles at Sierra Army Depot. By establishing Sierra Army Depot as a DOD facility for long term combat

and tactical vehicle storage, the Army and DOD could gain great efficiencies and savings. The Air Force has demonstrated this with its AMARC.

The Army must potentially look at converting its manufacturing facilities to Federal Government Corporations. This would allow the Army to divest of unneeded infrastructure and at the same time retaining the critical core capabilities of these facilities. Additionally, due to the uniqueness of these four facilities, these facilities potentially could fall under DOD.

Performance based logistics will ensure for improved weapons systems readiness and at the same time reducing costs. As this is a fairly new concept for DOD, the Army must continue to leverage PBL to maximize support to the Warfighter.

The Army must make a commitment to fund its capital investment program. Failure to do so will result in the depots and manufacturing facilities to continue to fall behind private industry. More importantly, it must look to the long term future.

Leveraging laws such as EUL and ASPI are critical to bring private industry investment in the Army's depots and manufacturing facilities. The Army has demonstrated some success in the application of these laws, but now is the time to maximize these laws to the fullest extent possible.

Workforce revitalization is perhaps the most important part in transforming the Army's depots and manufacturing facilities. The workforce's unique skills, which are not easily found in the private sector, allow the Army to quickly respond to emerging requirement during a National crisis. Anniston Army Depot has laid the foundation for a successful program. This program must be exported not only across the Army but all of DOD.

To synchronize the efforts of all the services a Joint Depot Command should be established to reduce redundancies among the services. This would allow DOD to be more responsive to the Warfighter through a streamlined system. This command would require additional personnel, but through consolidation of functions and overhead it would garner personnel savings.

The time is now for the Army to move forward in support of the Warfighter in the 21st Century. Failure to do so will result in an Army Organic Industrial Base that is nothing more than a mere Cold War legacy.

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